

c

b

a

$$\max v_{bio}$$

s.t.

$$\mathbf{N}\mathbf{v} = \mathbf{0} \text{ (steady state)}$$

$$\mathbf{v}_{\min} \leq \mathbf{v} \leq \mathbf{v}_{\max} \text{ (flux capacity)}$$

(other constraints)

$$v_i \leq k_{cat}^{ij} E_j \text{ (enzyme constraints)}$$

$$\sum_j MW_j E_j \leq E_{tot}$$

translation constraints

considering ribosomes

transcription constraints

(growth constraints, $v_{bio} = \mu$)